

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-PYRO FMEA NO P2-1A -097 -1 REV:12/02/87

ASSEMBLY	: NOSE LANDING GEAR	CRIT. FUNC:	1
P/N RI	: SKD26100101-201	CRIT. HDW:	1
	: V070-552002-003	VEHICLE	102 103 104
QUANTITY	: 1	EFFECTIVITY:	X X X
	: ONE ASSEMBLY	PHASE(S):	PL LO OO DO X LS

		REDUNDANCY SCREEN:	A-	B-	C-
PREPARED BY:		APPROVED BY:	12/4/87	APPROVED BY (NASA):	1-7-88
DES	R. H. YEE	DES	<i>R. H. Yee for A.S. Ordway</i>	SSM	<i>R. H. Yee</i>
REL	M. B. MOSKOWITZ	REL	<i>[Signature]</i>	REL	<i>[Signature]</i> 12-16-88
QE	E. M. GUTIERREZ	QE	<i>[Signature]</i>	QE	<i>[Signature]</i> 1-7-88

ITEM:
 UPLOCK RELEASE THRUSTER, NOSE LANDING GEAR

FUNCTION:
 EMERGENCY BACKUP TO HYDRAULIC ACTUATOR - PROVIDES BACKUP TO RELEASE NOSE LANDING GEAR AFTER HYDRAULIC SYSTEM MALFUNCTIONS. PYRO UPLOCK FIRES AUTOMATICALLY 1 SECOND AFTER GEAR DEPLOY COMMAND IF PROXIMITY SWITCH DCES NOT SENSE MOVEMENT.

FAILURE MODE:
 FAILS TO FUNCTION

CAUSE(S):
 CARTRIDGE FAILS TO FIRE, JAMMING, STRUCTURAL FAILURE, PRESSURE BLOWBY AT CARTRIDGE/THRUSTER HOUSING INTERFACE DUE TO LOOSE JAM NUT

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A). NOSE LANDING GEAR WILL NOT DEPLOY (LOSS OF HYDRAULIC SYSTEM #1 HAS TO OCCUR FIRST).

(B,C) NONE. EVENT OCCURS SECONDS BEFORE LANDING.

(D) POTENTIAL LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:
 (A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN
 THRUSTER DESIGNED TO OPERATE WHEN FIRED WITH AN 80% LOADED CARTRIDGE AND INITIATED WITH EITHER OR BOTH NASA STANDARD INITIATORS (NSI'S); DESIGN MARGIN EQUAL TO OR GREATER THAN 1.4. PRESSURE CARTRIDGE DESIGN ALLOWS FOR LOCKWIRING OF JAM NUT AFTER INSTALLATION TORQUE OF 300 INCH-LB AND DIMENSIONAL VERIFICATION OF POSITION PER OMI V5012, SEQ. 28.

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(B) TEST

QUALIFICATION TESTS: HUMIDITY, SALT FOG, SHOCK, RANDOM VIBRATION, THERMAL VACUUM, THERMAL CYCLING (-65 DEG F TO +200 DEG F), LOCKED SHUT, MARGINAL CARTRIDGE ACTUATION, -65 DEG F/AMBIENT/+200 DEG F FIRINGS, HOUSING BURST TEST (GREATER THAN 2.5 X NORMAL OPERATING PRESSURE). CERTIFICATION REQUIREMENTS (CR) 26-325-0006-0001, OEA INC. #2571-8/A; SKD26100102.

NOSE GEAR DEPLOY SYSTEM TEST (DOWNEY): 3 FULL SCALE DEPLOYMENT TESTS WITH SIMULATED AIRLOADS; 2 AMBIENT AND ONE AT 0 DEG F (CR-26-510601-001).

ACCEPTANCE TESTS: EXAMINATION OF PRODUCT, HOUSING PROOF PRESSURE (1.4 X NORMAL OPERATING PRESSURE), X-RAY (FOR MISSING COMPONENTS, FOREIGN OBJECTS, VOIDS, CRACKS, AND INTERNAL DEFECTS), PISTON-LOCK PULL TEST (150 LB), INTERNAL PRESSURE UNLOCK TEST, LEAK TEST ON ASSEMBLY (CR-26-325-0006-0001, ATP OEA INC.#2571-7; SKD26100102).

OMRSD: GROUND TURNAROUND INCLUDES VISUAL INSPECTION OF THRUSTER FOR EVIDENCE OF DAMAGE (V55AR0.220) AND VISUAL INSPECTION AND MEASUREMENT OF GAP FOR EVIDENCE OF THRUSTER EXTENSION (V55AU0.010).

(C) INSPECTION

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES AND STORAGE ENVIRONMENTS ARE MONITORED AND VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ASSEMBLIES ARE X-RAYED TO ASSURE FREEDOM FROM VOIDS AND CRACKS AND TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAILED PARTS. VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION. CARTRIDGE RELATIVE TO HOUSING IS INSPECTED AFTER INSTALLATION TO ASSURE PROPER BACKUP RING SEATING TO PREVENT PRESSURE BLOWBY.

NONDESTRUCTIVE EVALUATION

X-RAYS ARE REVIEWED BY VENDOR, DCAS, AND NASA ENGINEERING AND QUALITY.

CRITICAL PROCESSES

SELECTED MANUFACTURING/ASSEMBLY STEPS ARE IDENTIFIED BY NASA QUALITY ASSURANCE AND VERIFIED BY GOVERNMENT INSPECTION AS MANDATORY INSPECTION POINTS (MIPS). ALL MANUFACTURING PROCESSES, SUCH AS WELDING, PLATING HEAT TREATING, PASSIVATION, AND ANODIZING ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NONE.

(E) OPERATIONAL USE

NONE.